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Materialise Mimics Medical

Version 24.0 - Release Notes

CE
1639

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Regulatory Information

The medical edition of the Mimics Innovation Suite software version 24.0 (released in 2021) consists of the components **Materialise Mimics Medical 24.0** and **Materialise 3-matic Medical 16.0**.

Materialise Mimics Medical (briefly 'Mimics Medical') is intended for use as a software interface and image segmentation system for the transfer of medical imaging information to an output file. Mimics Medical is also intended for measuring and treatment planning. The Mimics Medical output can be used for the fabrication of physical replicas of the output file using traditional or additive manufacturing methods. The physical replica can be used for diagnostic purposes in the field of orthopedic, maxillofacial and cardiovascular applications. Mimics Medical should be used in conjunction with expert clinical judgement.

Materialise 3-matic Medical (briefly '3-matic Medical') is intended for use as software for computer assisted design and manufacturing of medical exo- and endo-prostheses, patient specific medical and dental/orthodontic accessories and dental restorations.

Usage of the software signifies your acceptance of the above. Please refer to the Instructions For Use for more information.

Manufactured in May 2021 by

Materialise NV

Technologielaan 15

3001 Leuven, Belgium

Phone: +32 16 39 66 11

www.materialise.com

管理医療機器

一般名称	汎用画像診断装置ワークステーション用プログラム（JMDN 70030012）
販売名	画像診断装置 Mimics Innovation Suite
認証番号	226AFBZI00159000
選任製造販売業者	マテリアライズジャパン株式会社 神奈川県横浜市神奈川区栄町 8-1 ヨコハマポートサイドビル
製造元	Materialise N.V. （ベルギー）

L-10656-02

Contents

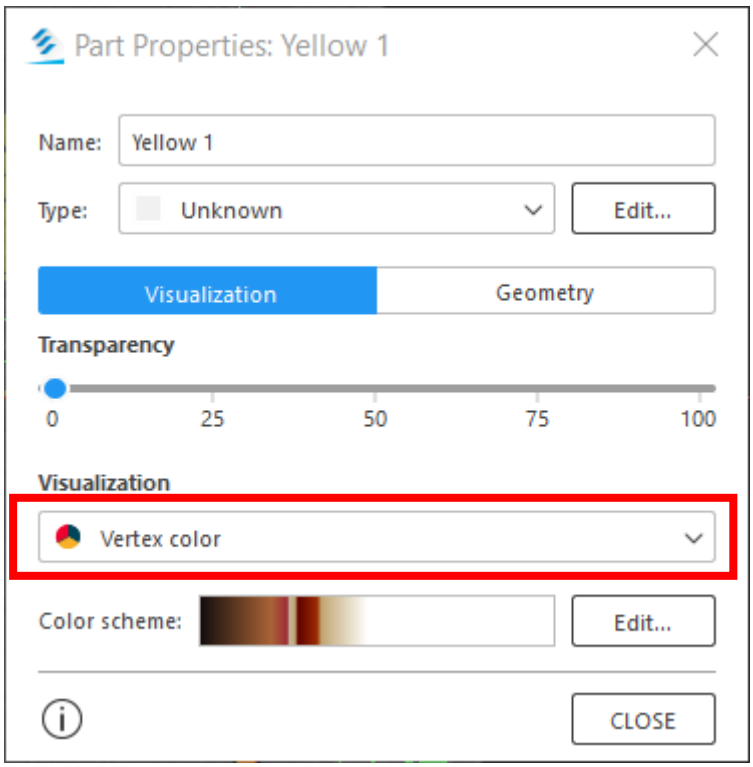
Materialise nv I Technologielaan 15 I 3001 Leuven I Belgium I mimics@materialise.be I materialise.com

1 What's New

1.1 Vertex color

Assign vertex color.

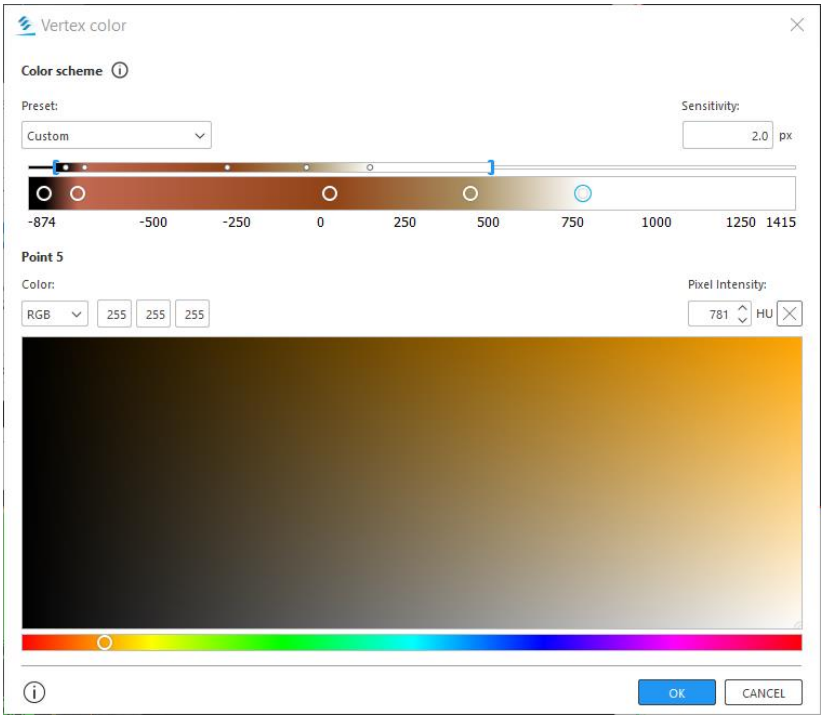
The assign vertex color tool allows to assign color information to individual vertices of a polygon mesh. This new functionality exists next to basic color assignment in the new part properties dialog. This dialog is shown below:



The part properties dialog still contains the same information as in the previous version, but is split into 2 tabs: "Visualization" and "Geometry".
The appropriate color assignment method can be selected from the dropdown marked by the red area, which then allows users to select between basic color and vertex color.

Selecting vertex color will open the vertex color dialog and assign an intensity value to each vertex. To define the intensity value in a vertex, the pixel intensity values along a ray that has its origin in the vertex and is directed inside of the part are evaluated.

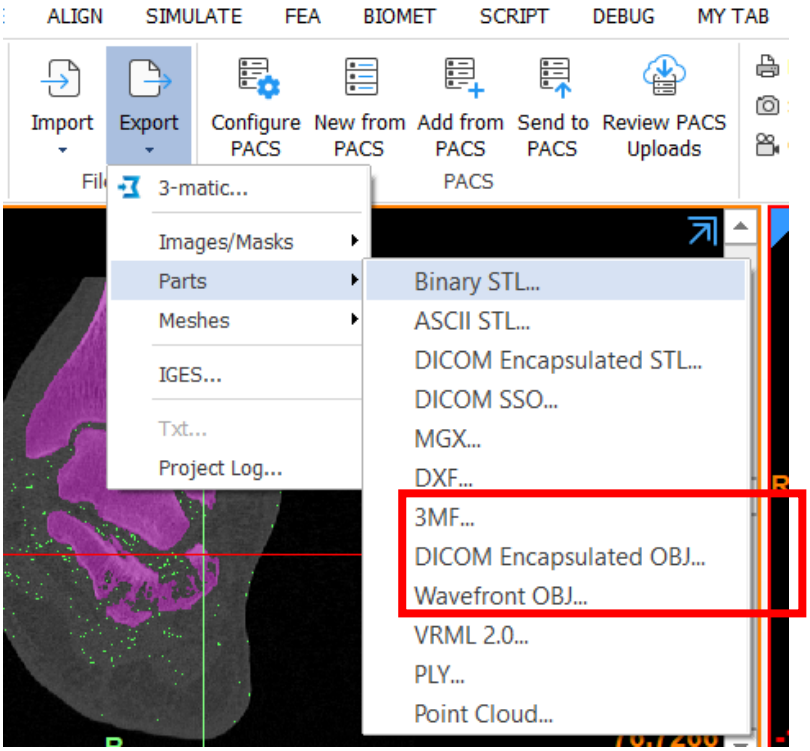
Users can assign a color map by selecting a preset or by creating a custom color map. A color map is created by indicating midway points in the vertex intensity range, and assigning a color to them. A gradient is then applied between these points, to get a smooth coloring. The specific colors of these midway points can be select via the lower part of the dialog, where RGB, HSB, HEX colors can be chosen.



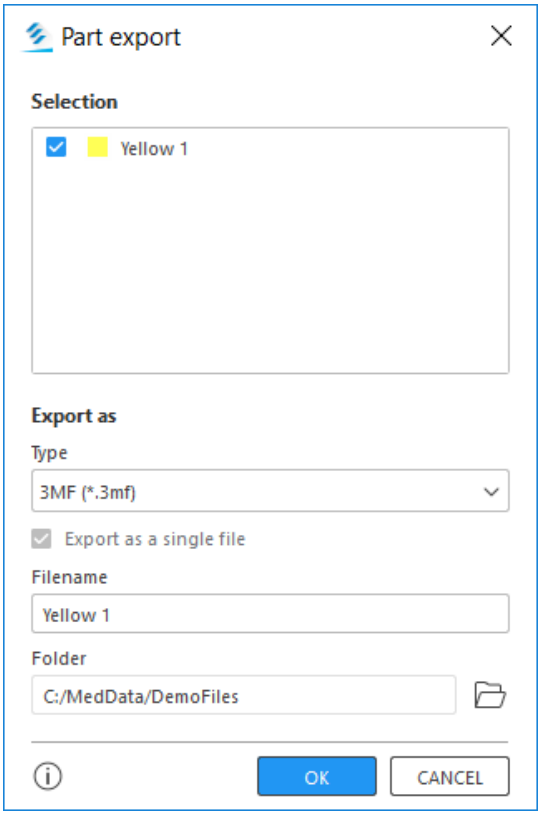
Note:
Assigning colors to parts with many vertices may result in a crash. Reduce the number of triangles via 3D tools > reduce or upgrade the graphical card.

Export 3MF, OBJ and DICOM encapsulated OBJ

Mimics now supports exporting of meshes into the OBJ, Dicom encapsulated OBJ and 3MF format types, including color information contained within. The export is located in the File tab:



This Part export dialog is shown below:

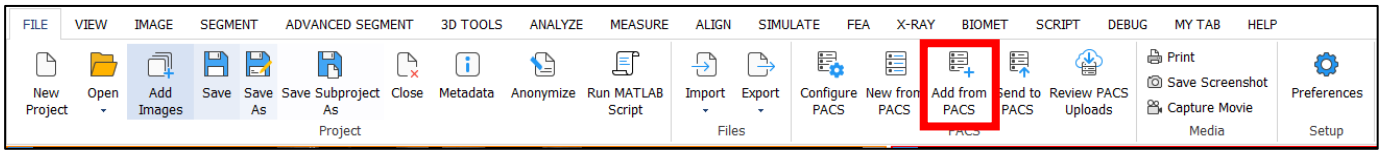


Here users can select which meshes to export, as well as the data type to export to. An exported filename and location can also be selected.
In case the users wants to export multiple parts, they can also be exported as a single file. In this case the filename shall by default be the name of the project in question.
In case the selected part contains color or texture info, this shall be exported as a separate file next to the OBJ format, in mtl and png formats respectively.

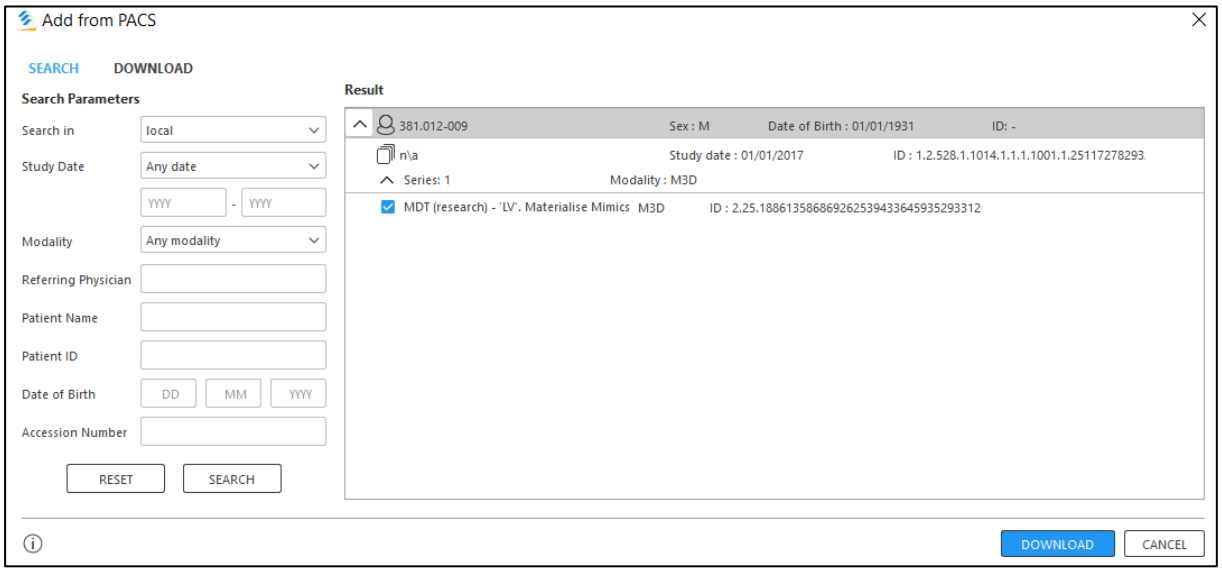
1.2 Import from PACS

Mimics now allows users to import meshes into the current image set from a connected PACS system. The supported object types are DICOM-encapsulated STL and SSO.

Parts can be imported by selecting the new “Add from PACS” button in the ribbon:



This buttons opens a new dialog, which allows users to search the connected PACS server for relevant meshes:



The desired parts can then be selected and downloaded. Once this is complete, the parts can be added to the current project by selecting the tickbox and pressing “Import”.

Once the import process is completed, parts are added to the project and appear in the PM tab.

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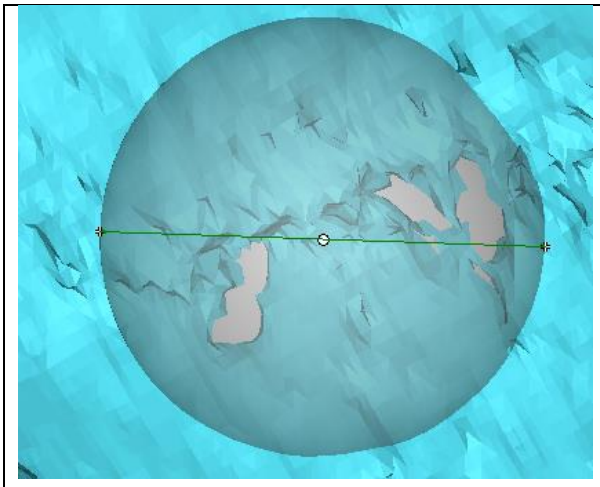
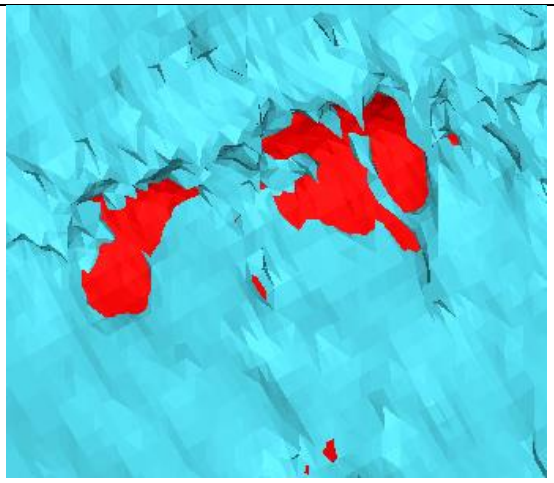
1.3 New tools available as plugin

Segment Thin Bone

The Segment Thin Bone plugin extends the Segmentation Ribbon tab with the Segment Thin Bone tool. This tool allows you to quickly close holes that appear in areas with thin cortical bone, such as orbital floors or the body of the scapula.

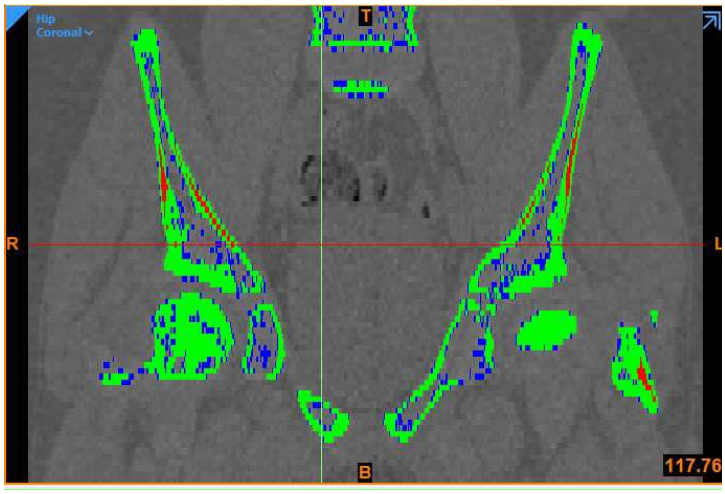
The holes occur as a consequence of the limited resolution of CT scanners. Filling these holes restores a continuous surface, making it easier to design patient-specific instrumentation and implants.

To close a hole, draw a line over the hole in any 2D or 3D view. As a result a patch will be calculated, which will then be merged with the selected mask to cover the hole.

	
Indicate the hole to close	Calculated patch on 3D view

Compare Masks

The Compare Masks tool allows the user to compare two mask qualitatively and quantitatively. It visualizes mask differences and outputs the following metrics: Dice coefficient, average symmetric surface distance (ASSD) and Haunsdorff distance.



Green: identical voxels, Red: over-segmented, Blue: under-segmented

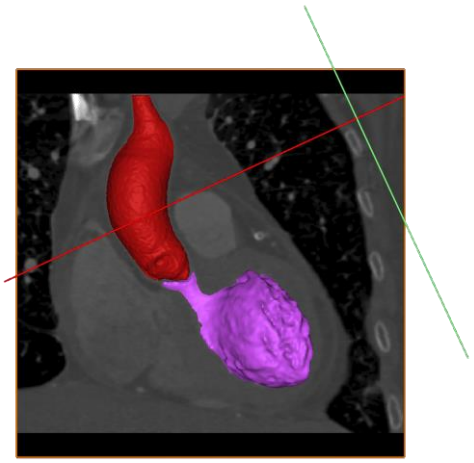
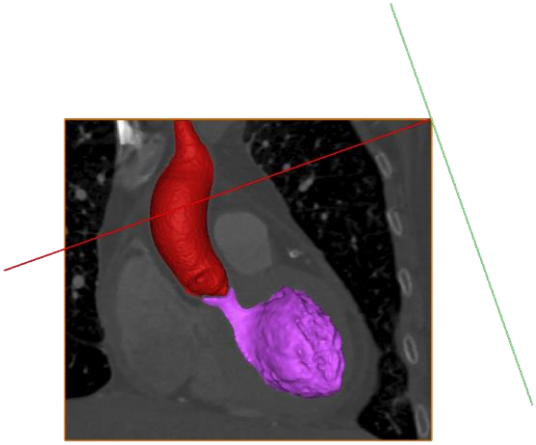
1.4 Additional improvements

Scripting: Add a tool in the ribbon

A new scripting framework was added to Mimics. This will allow the Mimics team to release functionality outside the yearly release cycle and will allow users to bind custom scripts to a new button in the ribbons, customizing their Mimics interface.

MPR improvements

In Mimics 23.0 the MPR slices were not generated for the full image stack, preventing user to navigate to the outer corner of the image stack. This is fixed in Mimics 24.0.

	
Mimics 23: MPR position limited cannot reach corner point	**Mimics 24:** MPR position can reach utmost corner point

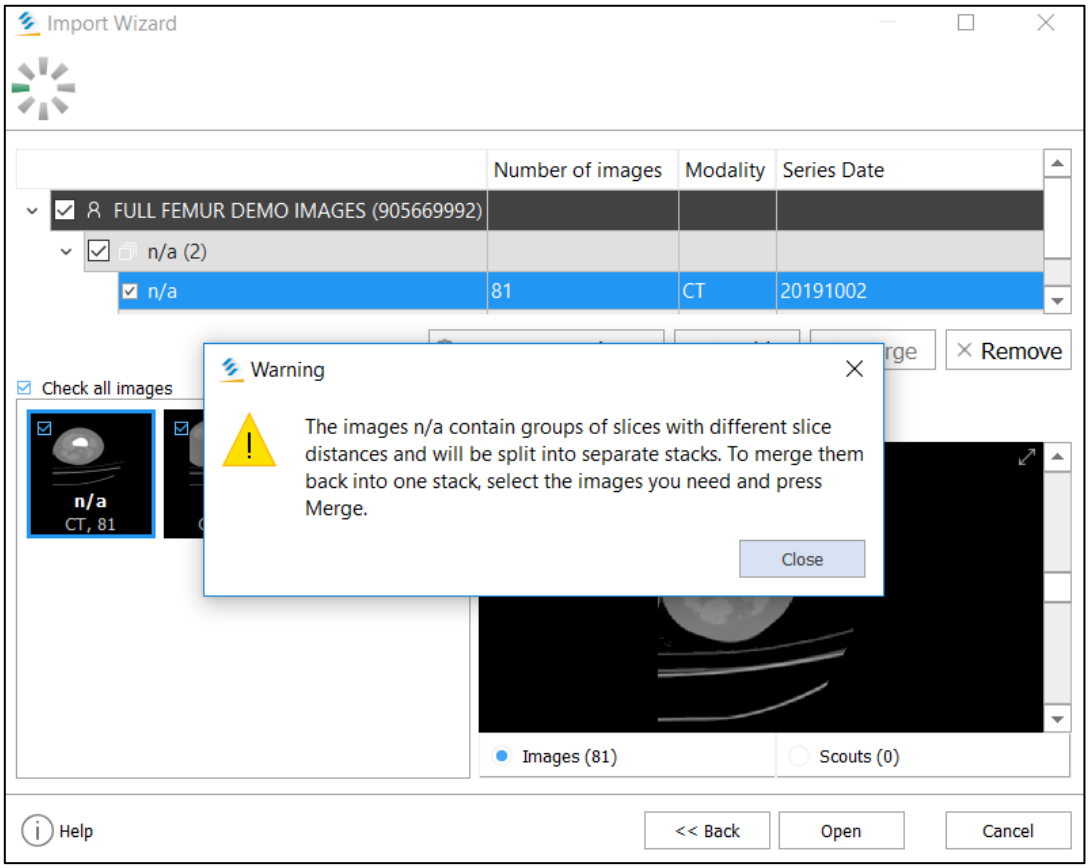
Locate behavior

The locate behavior for measurements was improved so that measurements created on MPR views can be located even when the MPR is not active.

Variable slice increment

In the new project wizard, a series of checks is implemented that will attempt to eliminate slice distance variations within an image set by splitting, reslicing the imported image set or interpolating over missing slices.

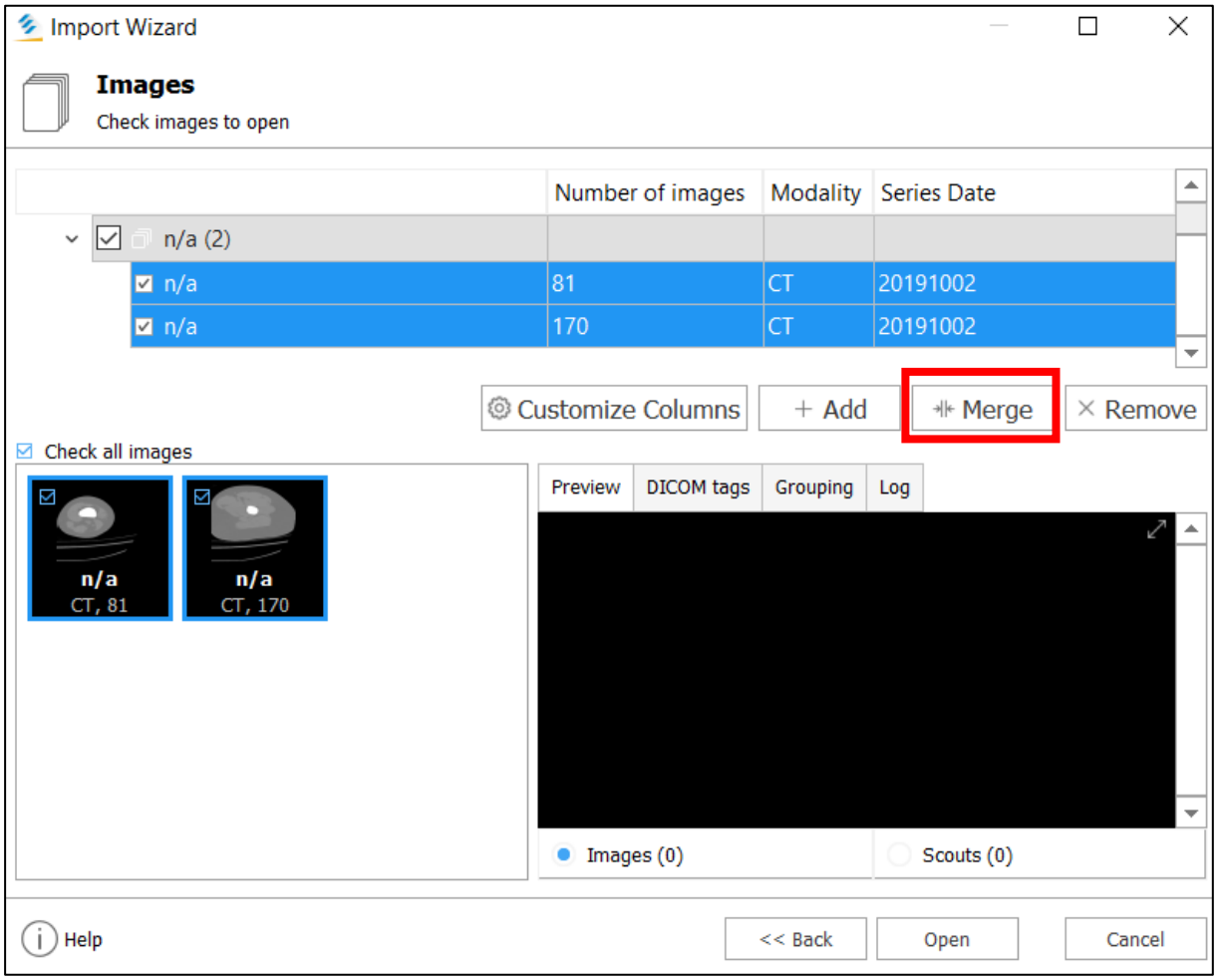
In the new project wizard, a check is performed that detects variable slice increments in imported images. When detected, this is shown to the user as follows:



In case variability can be solved by splitting the image set in question into 3 or less image sets, the image sets are split in the New Project wizard. Image sets will never be split into more than 3 parts.

In the case of the example image, a single image set was imported that contains two distinct slice increments and thus will be split into two image sets.

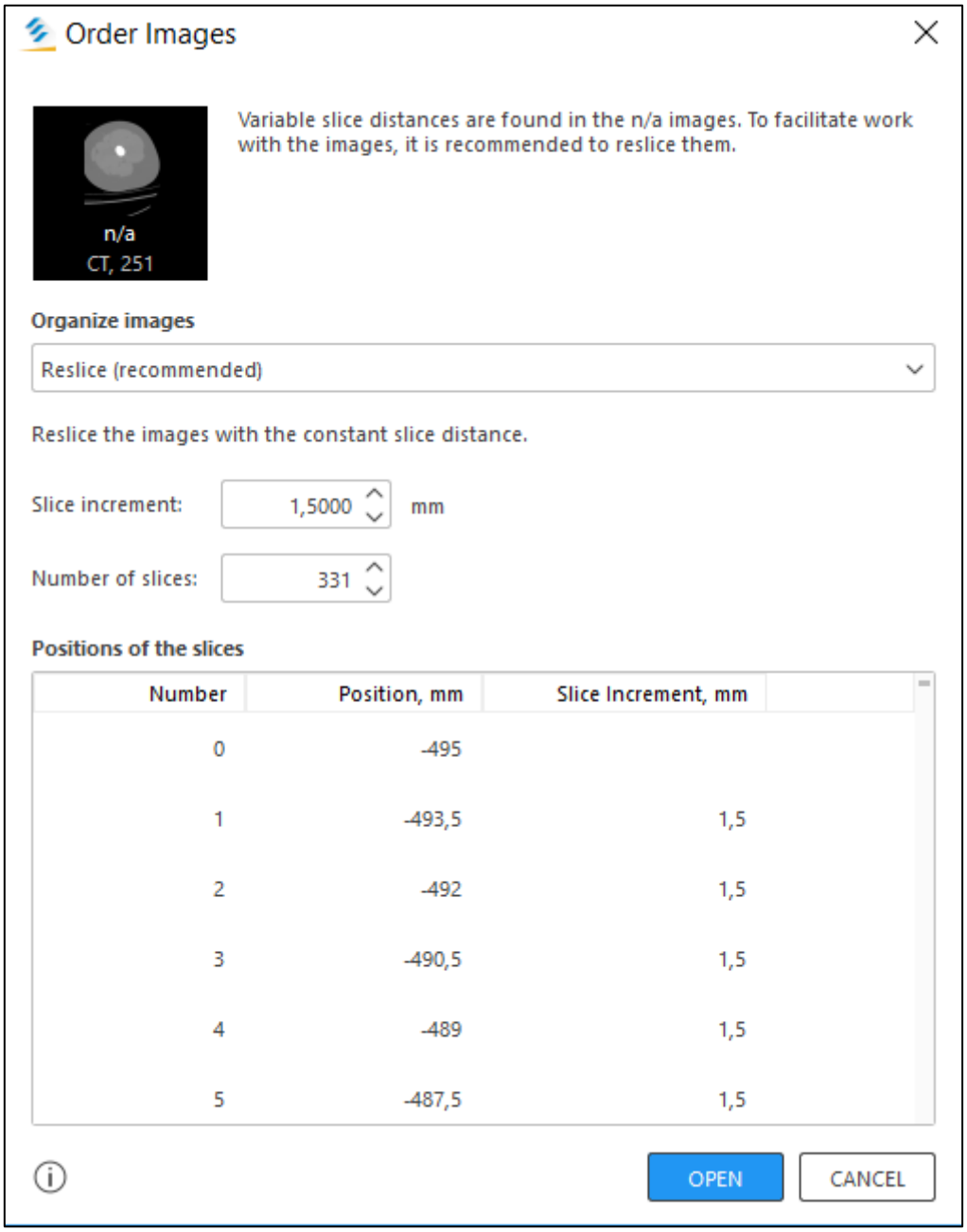
The merge button is also available in the New Project wizard in case users wish to keep the image set whole:



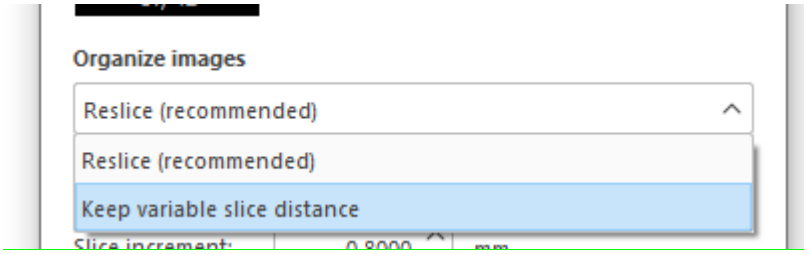
To achieve this merge, users should select both image sets in the list shown and press the “merge” button, indicated in red.

Additionally, users can also navigate to the “grouping” tab on this same screen (marked in yellow) and there de-select the entry “Variable slice increment” to permanently switch off the splitting of image sets to remove variability.

When users proceed from this screen to create the new project, another set of checks regarding slice increment variability is performed. In the case of this example, the images were merged back together and this prompts another dialog when creating the project, that suggests users to resliced the selected images to still fix the slice increment variability.

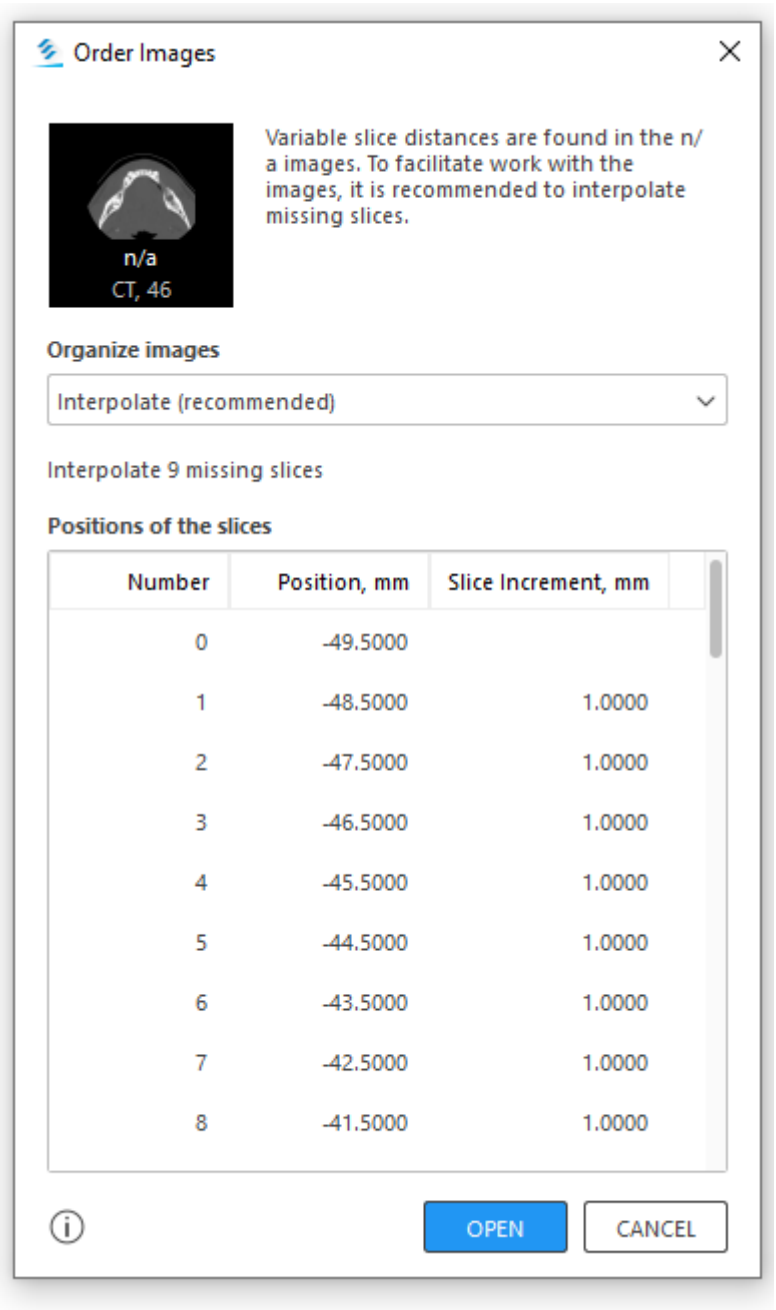


In this dialog, users can select the resliced option, or select to keep the variability from the dropdown.

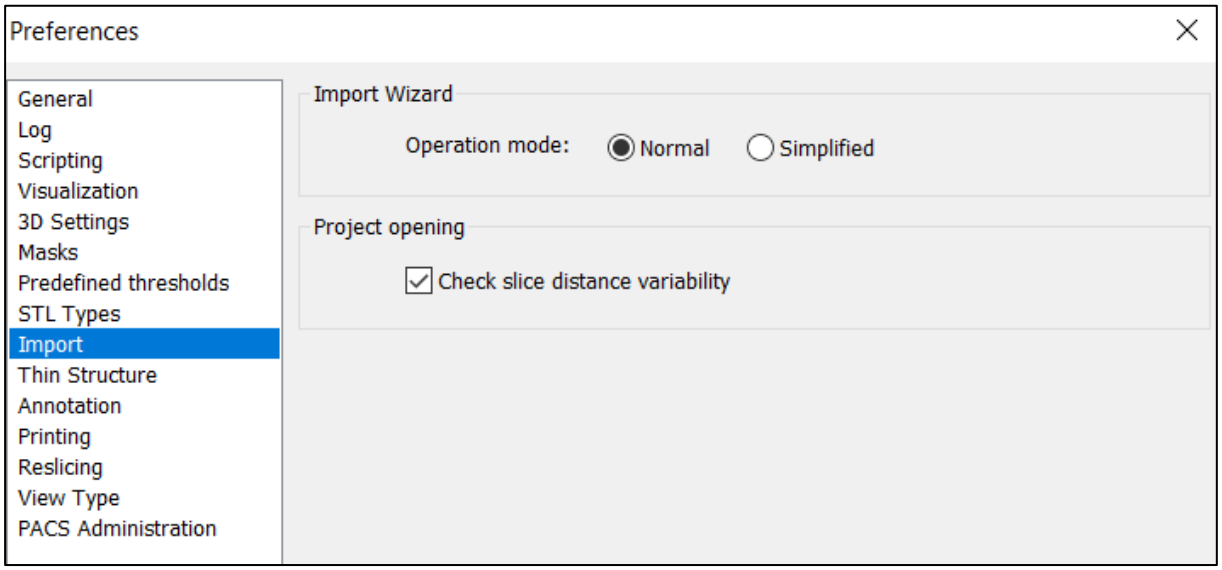


If a resliced is selected, users have the option to adapt the proposed new slice increment and number of slice, according to their preferences.

Some other steps may be also be proposed in this dialog, such as interpolation over missing slices, if any were detected.



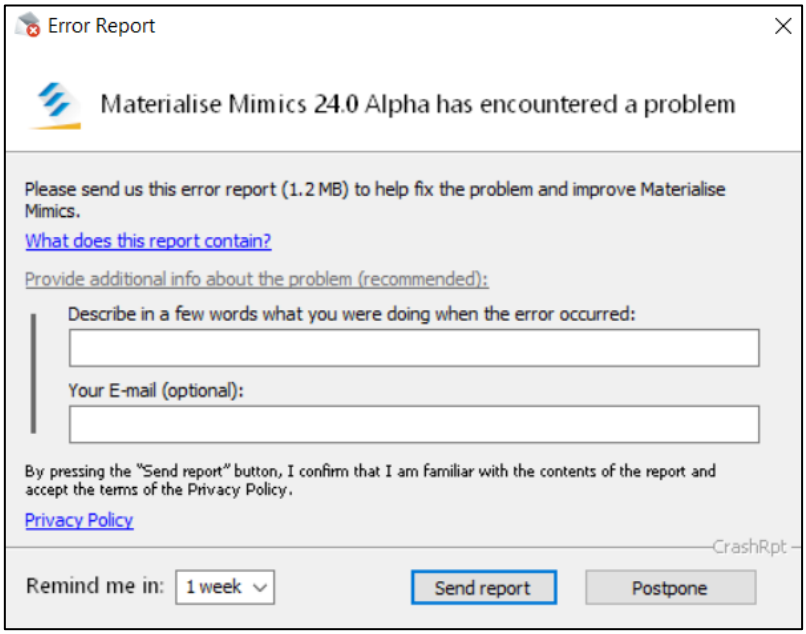
Finally, these checks can also be disabled permanently in the Mimics preferences by navigating to the “Import” section and de-selecting the “Check slice distance variability”.



Crash handler

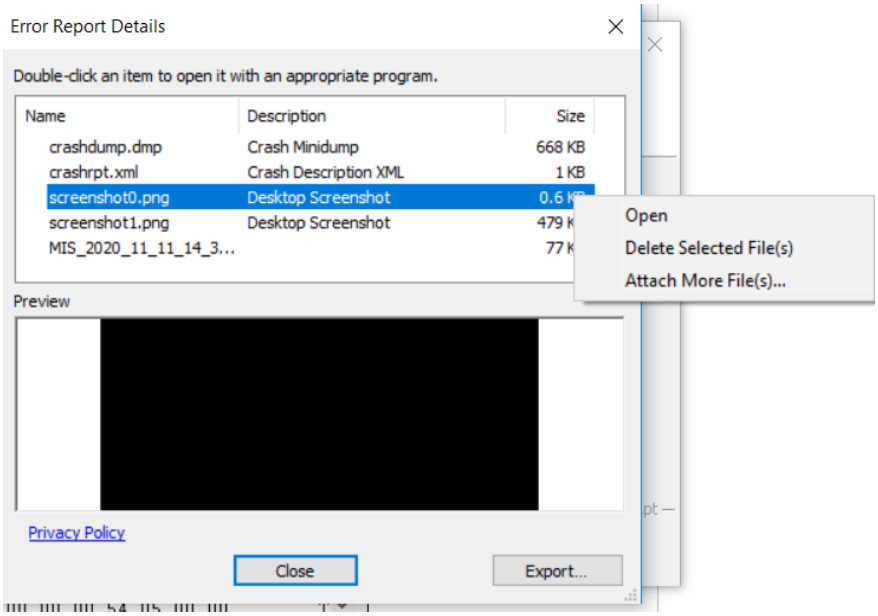
A new crash handler has been implemented into Mimics that will allow users to easily send a crash report archive to our support teams. This handler will appear in a separate dialog after a crash had occurred and also allows users to inspect and alter the data sent to Materialise.

The new crash screen is shown below:



Users are requested to give additional info about the situation in which the crash occurred as well as their email address for further follow-up.

Clicking the “What does this report contain” text opens a separate dialog that shows users more details about the info that is scheduled to be sent to Materialise for review.



The crash archive contains a crashdump, an XML file, some screenshots and other information. Users can open, remove or export these items and even add more items to the list.

The privacy policy, which is stored locally can also be accessed via the appropriately labeled text “Privacy Policy”.

File locking

Previously multiple instances of Mimics could edit the same Mimics project file, while this was allowed it was not fully supported and could result in a corrupt Mimics project file. To prevent this, in Mimics 24.0 only one instance of Mimics will be allowed to edit the Mimics project file. Other instances of Mimics will open the Mimics project file in read-only mode.

2 Known Issues

2.1 Installation

- Issue 3-matic: Uninstalling Mimics 23.0 or 24.0 beta may corrupt 3-matic 14.0 and lower 3-matic version. Uninstall of all version will be required.

2.2 Base module – general

- Mimics main window frame loses focus when switching layout or zooming to full screen. (Issue: 512307)
- Python API : mimics.data.images[].physical_dimensions are returned as (width, number of slices, height) while it is expected to be (number of slices, width, height). (issue: 636577)
- File > preferences > 3-matic: auto search for the 3-matic installation take long. (issue: 673717)
- File > New from PACS: Download fails in case of very long Patient ID (Issue 775237).
- File > new from PACS: import from PACS via C-move protocol will wrongly trigger the non-strict import warning.
- File - Image import: when importing a non-aligned image stack the slice position in the Z-position will have a slight deviation compared to the original Dicom tags. (issue: 744982)
- File > anonymize: the anonymized study ID (0020,0010) exceeds the allowed 16 chars. (issue: 804032)
- View > Cineloop: in rare cases the cineloop doesn't play. (issue: 698468)
- View > Fluoroscopy: unexpected angles changes for oblique images (issue 815988)
- View > MPR (View > Reslice > Along Plane): As explained in Section 1.6.1, you can activate the MPR cursor mode by holding the SHIFT key. Known issue: after pressing SHIFT you need to move the cursor before it effectively switches to MPR cursor mode. (issue: 759037)
- View > indicators – intersection line: Coronal intersection lines disappear when switching layout in F3-F5-F2 order. Reopening the project fixes the visualization issue. (issue: 895312)
- Image > Organize images: seldom crash of organize images on specific CPU setup. (issue: 761161)
- Image > Automatic Registration: Outputs of subsequent results may differ (issue: 802365)
- Snapping: snapping to Diameter circular construction line doesn't work (issue: 897880)
- Locate: unexpected behavior of locate when duplicating MRP objects.(issue: 765115)
- PM > Objects tab > properties: Crash on assigning vertex color due to out of memory on graphic card (issue: 874417)
- PM > Objects tab > assign part to image stack: in rare occasions a part cannot be assigned to a different image stack (issue: 900718)
- PM > Measurements: The visibility of measurements cannot be changed if the MPR in which they are created and located differ (issue: 895884)

2.3 Base module – segmentation

- Advanced segmentation – CT heart: price per case licenses will fail if licenses are present locally and on a floating license server. (issue: 702795)

- 3D tools: deleting a mask/part when a tool is active will restore the object after closing the tool. (issue: 710467)
- 3D tools: Created analysis planes or mirror planes when a 3D tool was open, will be lost when closing the tools. Pressing undo will make the planes again available. (issue: 803270)
- Advanced segment – Cut Airway: showing cutting contours preview can be slower compared to Mimics 22.0 (issue: 806635)
- Segment – Crop: There is no possibility to switch layouts while cropping (using the F2-F3-F4-F5 key buttons (issue: 868685)

2.4 Other modules

- Simulate - Cut - With Polyplane: in rare cases the part is not fully cut. Workaround apply triangle reduction before cutting or fix the cut part in 3-matic. (Issue: 489675).
- Simulate – Cut – With Polyplane: when the cutting plane is not intersecting with the part a dummy part is created (issue: 899939)
- Centerline – fit centerline: fit centerline results may differ on different hardware. The result is still within the acceptance criteria. (issue: 794485)
- Scripting: func_view_maximize: restore view dimensions may differ depending on starting zoom level of current view (issue 807299)
- FEA - Assign Material: materials cannot be assigned to sub-volumes (issue: 901259)

3. System Requirements

2.5 Minimum Requirements

Software	Hardware
Windows® 10 – 64bit Version 1607	Third generation Intel® Core™ i5 or equivalent
Microsoft Edge® or equivalent	8 GB RAM
PDF viewer	DirectX® 11.0 compliant graphics card with 1 GB RAM
.NET framework 4.6.1 (or higher)	15 GB free hard disk space
	Resolution of 1920x1080

Note: Mac® users can install MIS using Boot Camp® in combination with a supported Windows OS

2.6 Recommended Requirements

Software	Hardware
Windows® 10 – 64bit Version 1909	Third generation Intel® Core™ i7 or equivalent
Microsoft Edge® or equivalent	16 GB RAM
PDF Viewer	DirectX® 11.0 compliant AMD Radeon™ / NVIDIA® GeForce® card with 2 GB RAM
.NET framework 4.6.1 (or higher).	20 GB free hard disk space
	Resolution of 1920x1080 or higher

Note: Other qualifications may apply. When working with datasets larger than 1GB the system should comply with the recommended system requirements. Advanced segmentation tools such as Smart Expand and Coronary segmentation require hardware as specified in the recommended requirements even for smaller datasets. When working with 4D or multi stack data, the amount of RAM needed increases as you import more image series into the project.

Materialise Mimics is software and does not degrade in performance. Its lifetime is determined by commercial requirements, obsolescence of its techniques or obsolescence caused by changes in its host environment (refer to above requirements). Support can in any case not be guaranteed beyond 7 years after the release of this particula version of the software.

The following operating systems were used to test Mimics 24.0:

- Windows 10 Pro/Enterprise version 1803, 1809, 1903, 1909, 2009 64-bit
- Windows Server 2019 Standard version 10.0, RDP

4. Contact Information

For technical support, please contact our Customer Support team: mimics@materialise.be.

For more information, please check our website http://medical.materialise.com or the Materialise Academy http://www.materialise.com/en/academy/medical/mimics-innovation-suite.

For scripting related support, the MIS Scripting Forum can be consulted: https://community.materialise.com/.

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